

NORTH AMERICAN THANEROCLERINAE LARVAE
(COLEOPTERA: CLERIDAE)

DAVID E. FOSTER

Department of Entomology and The Museum,
Texas Tech University, Lubbock, TX 79409

ABSTRACT

Mature larvae of 3 Thaneroclerinae genera, *Thaneroclerus*, *Zenodosus* and *Ababa* are described or redescribed and a key for their identification presented. The mature larva of *Ababa tantilla* (LeC.) is described. Characters of potential value for deriving a classification of the subfamily are discussed.

Diagnoses of larval Thaneroclerinae are based on relatively few taxa. The subfamily was characterized by Böving and Champlain (1920) in a work based solely on the larva of *Thaneroclerus buquet* (Lef.). Since that time, larvae of *Zenodosus*, *Isoclerus* and *Metaxina* have been described or figured.

Recent collections of *Ababa tantilla* (LeC.) by John Lawrence, Museum of Comparative Zoology, Harvard University, complete the larval representation of North American Thaneroclerinae genera. Examination of this material along with specimens of *T. buquet* and *Zenodosus sanguineus* (Say) provided by Dr. D. M. Anderson, National Museum of Natural History, permits a further assessment and clarification of thaneroclerine subfamilial and generic characteristics and allows the introduction of new information including a description of the mature larva of *A. tantilla*.

NORTH AMERICAN THANEROCLERINAE

Description: Mature larva with body subclaviform, clothed with scattered short whitish hairs, segmental surfaces salmon colored, intersegmental membranes light salmon to cream colored, sclerites testaceous to piceous. *Head* capsule subrectangular with dorsal surface slightly convex, sides parallel, ventral surface flattened, longer than wide in dorsal view (4:3) and longer than deep in lateral view (3:2); epicranium smooth or finely wrinkled, epicranial suture distinct; frons elongate, oblique, with anterior margin transverse; hypostoma with anterior margin transverse; stemmata, 5 on either side arranged in anterior row of 3 and posterior row of 2; antenna 3 segmented, basal segment barrel shaped, middle segment globose, about 2/3 as long as basal segment in dorsal view, its apical surface oblique and bearing a short conical appendix, terminal segment tubular, slightly bowed at middle, equal to middle segment in length, apex bearing a single long hair; mandible about as long as frontal suture, longer than wide in dorsal view (3:2); gula as long as frons, sides abruptly expanded in front of hind margin, expanded area sometimes bearing a large tubercle. *Thorax* much shorter than abdomen in dorsal view; pronotum subrectangular, much wider than long (2:1), bearing a well-chitinized shield equal to head in width, prosternal sclerite elongate and slender; meso- and metanotum each bearing a pair of subcircular sclerites. *Legs*

shorter than meso- and metathorax combined (2:3), joints well chitinized. *Abdomen* with segments 1 through 8 about 1/2 as long as broad in dorsal view, ampullae faintly indicated, preeusternal and eusternal sclerites fused, spiracles bicameral and smaller than those of meso- and metathorax (2:3); segment 9 as long as broad in dorsal view, urogomphi rudimentary or lacking, basal plate subcircular, its surface flattened and lightly to heavily sclerotized or basal plate absent.

Discussion: Thaneroclerinae is unique among Cleridae in that it is the only subfamily in which the larvae exhibit a definite epicranial suture and the only one with bicameral spiracles, the thoracic members of which are larger than those on the abdomen. The subfamily is further characterized by the elongate, rectangular head bearing 5 stemmata on either side and by the abrupt postmedial expansion of the gula (Fig. 2).

The nature of the gular tubercle and the development of the urogomphi and basal plate provide the character states most useful for separating larvae of the 3 North American genera.

KEY TO MATURE LARVAE OF NORTH AMERICAN THANEROCLERINAE

1. Ninth abdominal tergum bearing a basal plate; gula bearing a large postmedial tubercle 2
- 1'. Ninth abdominal tergum without a basal plate; gular surface flat *Ababa*
- 2(1). Basal plate bearing paired rudimentary urogomphi *Thaneroclerus*
- 2'. Basal plate without urogomphi *Zenodosus*

Ababa Casey (1897:653)

Description: Mature larva—length 4.7-5.0 mm, head capsule width .30-.35 mm; body broadest at abdominal segment 5, surface with membranous areas salmon colored, sclerites testaceous to flavotestaceous. *Head* capsule with surface smooth; stemmata on either side arranged in anterior arcuate row of 3 and posterior row of 2, lower member of posterior row at level below upper member of anterior row (Fig. 1); mandible with outer margin strongly bowed, broadly arcuate inner margin bearing small pointed tooth distal to retinaculum (Fig. 3); gula with lateral margins abruptly expanded in front of hind margin, surface flat or very slightly tumescent behind middle (Fig. 2). *Thorax* shorter than abdomen in dorsal view (1:2); pronotum with dorsal shield moderately sclerotized, covering nearly its entire surface; mesonotum bearing pair of moderately sclerotized, subcircular sclerites; metanotum with paired sclerites faintly indicated. *Abdomen* with tergum 9 membranous, basal plate and urogomphi absent.

Discussion: The preceding description is based on specimens of *A. tantilla*. They are most easily distinguished from mature larvae of *Zenodosus* and *Thaneroclerus* on the basis of size. The absence of a basal plate on abdominal segment 9 and the absence of a gular tubercle serves further to distinguish *Ababa*.

The following description of *A. tantilla* is based on an understanding of characters useful at the specific level in other clerid taxa.

Ababa tantilla (LeC.) (1865:96)

Description: Mature larva—length 4.7-5.0 mm, head capsule width .30-.35 mm. *Head* capsule testaceous, surface smooth, genal and hypostomal areas bearing scattered hairs; frons testaceous with anterior 1/4 evanescent to dark brown anterior margin, surface smooth, bearing long hair near each lateral margin at middle and at anterior 1/4 and bearing 4 short hairs subequally spaced behind anterior margin; clypeus transverse, surface smooth and translucent; labrum transverse, surface smooth and tumescent; mandible with dorsal surface bearing single hair in front of hind margin, inner margin broadly arcuate, bearing small pointed tooth in front of retinaculum (Fig. 3); maxilla with base of cardo and stipes transverse, glabrous; labium appearing membranous and undifferentiated; gula with lateral margins abruptly expanded in front of hind margin, surface smooth, flat and glabrous (Fig. 2). *Abdomen* with tergum 9 membranous, basal plate and urogomphi absent.

Specimens Examined: FLORIDA: Jackson Co., Florida Caverns State Park, 6-IX-68 (3); 5-IV-69 (1).

Thaneroclerus Lef. (1838:13)

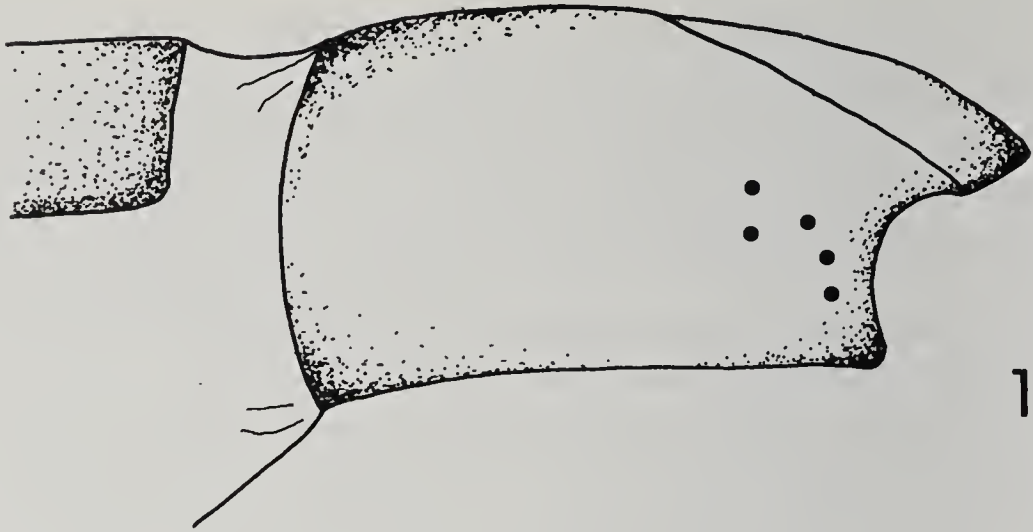
Description: Mature larva—length 11.0 mm, head capsule width 0.9 mm; body with sides subparallel, surface with membranous areas salmon colored, sclerites fuscotestaceous to piceous. *Head* capsule with surface smooth to finely wrinkled; stemmata on either side arranged in vertical anterior row of 3 and posterior row of 2 at an acute angle to anterior row, lower member of posterior row at level above the upper row (Fig. 4); mandible with outer margin convex, inner margin bearing obtusely crowned retinaculum at middle and low obtusely crowned tooth immediately distal to retinaculum; gula with large postmedial tubercle which bears one hair near center on either side. *Thorax* much shorter than abdomen in dorsal view (1:4); pronotum with dorsal shield well sclerotized and covering nearly its entire surface; meso- and metanotum bearing paired, moderately sclerotized, subcircular sclerites. *Abdomen* with tergum 9 bearing well sclerotized, subcircular basal plate; urogomphi reduced to 2 low tumescences arising in front of hind margin on basal plate.

Discussion: The preceding description is based on mature larvae of *T. buquet*. They are recognized most easily by their rudimentary but discernible urogomphi. Earlier instars have relatively larger urogomphi that make them easily distinguishable from both *Ababa* and *Zenodosus*. The larva of *T. buquet* was described and figured by Böving and Champlain (1920).

Specimens Examined: NEW YORK: Albany Co., 15-21-VIII-70 (4).

Zenodosus Wolcott (1910:21)

Description: Mature larva—length 9.2-11.0 mm, head capsule width 0.9-1.0 mm; body with sides subparallel, surface with membranous areas salmon colored, sclerites fuscotestaceous. *Head* capsule with surface smooth; stemmata on either side arranged in vertical anterior row of 3 and posterior row of 2 at an acute angle to anterior row, lower member of posterior row at level above upper member of anterior row; mandible with



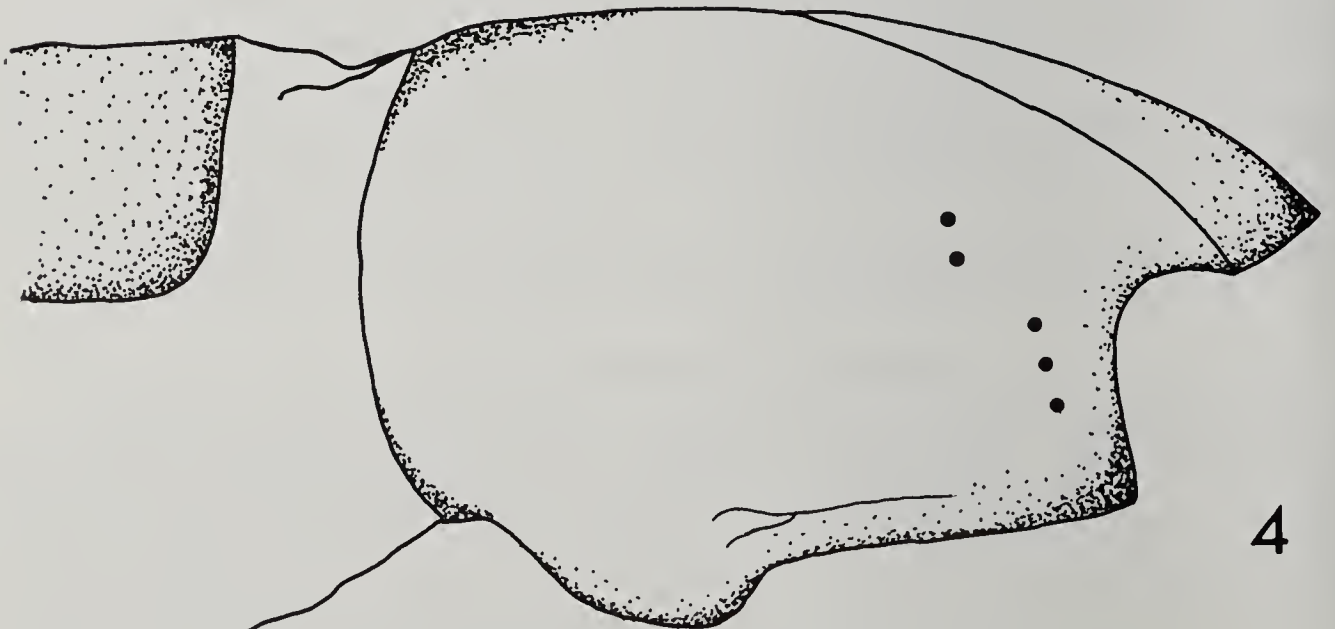
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2



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outer margin convex, inner margin bearing obtusely crowned retinaculum at middle and low obtusely crowned tooth immediately distal to retinaculum; gula with large postmedial tubercle which bears one hair near center on either side. *Thorax* much shorter than abdomen in dorsal view (1:4); pronotum with dorsal shield well sclerotized and covering nearly its entire surface; meso- and metanotum bearing paired moderately sclerotized, subcircular sclerites. *Abdomen* with tergum 9 bearing well sclerotized, subcircular basal plate, urogomphi absent.

Discussion: Larvae of *Zenodosus* can be separated from *Thaneroclerus* most satisfactorily by the absence of urogomphi. Böving and Champlain (1922) described and figured the mature larva of *Z. sanguineus* (Say).

PHYLOGENETIC CONSIDERATIONS

In their monograph, Böving and Champlain (1920) referred to *Thaneroclerus* as a very isolated genus. This contention is substantiated now for the entire North American Thaneroclerinae fauna by the elongate, rectangular head, the presence of a distinct epicranial suture, and modifications of the gula.

The availability of *Ababa* provides an opportunity to analyze character states within the subfamily. Crowson (1964) included the New Zealand species *Metaxina ornata* Broun in Thaneroclerinae and pointed to it as a primitive member of the subfamily on the basis of 3 larval characteristics: the presence of well-developed urogomphi, large notal sclerites, and the absence of a gular tubercle. Crowson's description and figures along with the North American genera treated herein point out several important characters.

Although any serious attempt to erect a classification of Thaneroclerinae would necessitate complete analysis of all available semaphoronts, it is worthwhile to discuss states of several larval characters that comprise transformation series or morphoclines (Table 1). Each character state is represented by a letter: capital letters denote apomorphic states, the lower-case letter in each instance represents the plesiomorphic state. States judged plesiomorphic are those that occur commonly in other clerid subfamilies or Cleroidea families.

The nature of the urogomphi and attached basal plate comprise one such morphocline. The heavily sclerotized basal plate and well-developed urogomphi of *M. ornata* are common among clerid larvae and are regarded as plesiomorphic. The reduction or loss of urogomphi and the loss of the basal plate represent apomorphic states.

Another morphocline involves the postmedial expansion of the gular margins and associated tubercle. The character state common to other clerid subfamilies, a more or less parallel-sided gula with a flat postmedial surface, is considered plesiomorphic. Expanded margins and the development of a tubercle are considered apomorphic.

Two additional morphoclines are comprised of states of the meso- and metanotal sclerites. Crowson (1964) considers the presence of a single large

Fig. 1-4: 1) *A. tantilla*, head capsule, lateral (scale line=0.2 mm); 2) *A. tantilla*, gula (scale line=0.15 mm); 3) *A. tantilla*, left mandible, dorsal (scale line=0.05 mm); 4) *T. buquet*, head capsule, lateral (scale line=0.4 mm).

sclerite such as that found on the mesonotum of *M. ornata* to be primitive. Reductions of meso- and metanotal sclerotization are considered apomorphic.

The distribution of character states available for analysis suggests that *Ababa* may occupy a position as the most derived genus among those under consideration and that *Thaneroclerus* and *Zenodosus* are related more closely to one another than to *Ababa*.

TABLE 1. OCCURRENCE OF SELECTED CHARACTER STATES AMONG THANEROCLERINAE LARVAE.

Characteristics	<i>Metaxina</i>	<i>Thaneroclerus</i>	<i>Zenodosus</i>	<i>Ababa</i>
1. Basal plate and urogomphi				
a. basal plate and urogomphi well developed				
A. basal plate well developed, urogomphi reduced to 2 short paired projectives				
A' basal plate well developed, urogomphi absent				
A'' basal plate and urogomphi absent	a	A	A'	A''
2. Development of gular tubercle				
b. gula with margins straight and surface flat				
B. gula with margins expanded and surface flat				
B' gula with margins expanded and tubercle present	b	B'	B'	B
3. Sclerotization of mesonotum				
c. single large plate				
C. small paired plates	c	C	C	C
4. Sclerotization of metanotum				
d. small medial plate and paired lateral sclerites				
D. small paired sclerites				
D' paired sclerites rudimentary	d	D	D	D'

LITERATURE CITED

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